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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
DEB, ANJAN K

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/074,863	MURPHY ET AL.	
	Examiner	Art Unit	
	Anjan K Deb	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *69-133* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *69-133* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This action is in response to amendment with response to election requirement filed 7-14-03. In view of the amendment which includes cancellation of claims 1-68 and introduction of new claims 69-133, the Election/Restriction requirement of previous office is no longer applicable and is withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 69-70, 76, 102-104, 110, 115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. (US 5,295,071).

Re claims 69, 102 Kuzma et al. discloses lightning detection system and method comprising a source (10) (Antenna module) (Fig. 1B) of electrical detection signal of an electromagnetic signal from a lightning discharge, an analog to digital converter 32 (Fig. 1A) for producing a digital detection signal representative of the electromagnetic field, and a digital processor 46 for determining the type of lightning discharge that produced the electromagnetic field based on the digital detection signal (column 7 lines 1-30) (see also column 20 lines 33-58 and DSP: 146) (Fig. 4C).

Kuzma et al. did not expressly disclose digital processor continually processing digital detection signal.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. by adding continually processing digital detection signal for near real time observation of lightning phenomena on a computer display.

Re claims 70, 103-104 Kuzma et al. disclose a signal conditioning element responsive to electrical detection signal for removing noise (filters) (column 6 lines 28-42). Re claim 104, blocking signal components above a threshold frequency is inherent characteristic of low pass filters.

Re claims 76,110 Kuzma et al. discloses plurality of sources (antennas) (column 19 lines 48-50) and digital processor 46 produces digital data characterizing lightning discharges and transmitting the data over a communications channel (communication bus 74) to central processor (controller module)(Fig. 1A,B).

Re claim 115 Kuzma et al. disclose amplifier/filter (14,16,18). Amplitude compression would be accomplished in the filters used for blocking noisy signals.

4. Claim 74-75, 108-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. in view of Ostrander (US 4,873,483 A).

Re claims 74-75, 108-109 Kuzma et al. discloses all of the claimed limitations as set forth above including determining lightning type. Cloud-to-ground and intra-cloud lightning discharges are broadly interpreted as lightning types.

Kuzmo et al. did not expressly disclose zero crossing detection.

Ostrander discloses lightning detection system comprising zero crossing detection circuit (Fig. 6) for accurately determining the time of lightning discharge (column 8 lines 56-68).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. by adding zero crossing detection disclosed by Ostrander for accurately determining the time of lightning discharge.

5. Claims 77, 111, 121-124 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. (US 5,295,071) in view of Pifer et al. (US 4,914,444).

Re claim 77, 111, 121-124 Kuzma et al. discloses all of the claimed limitations as set forth above without expressly disclosing discharge correlation component for correlating pulses from a plurality of sources to determine the time and location of discharge.

Pifer et al. discloses lightning detection system comprising plurality of data sources (10-13), a central analyzer 16 including a discharge correlation component for correlating discharge data from the sources for determining time and location of discharge (column 3 lines 52-56)(Fig. 1).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. by adding discharge correlation component disclosed by Pifer et al.

for correlating pulses from a plurality of sources to determine the time and location of discharge.

6. Claims 78-80, 112-114 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444), Pabst et al. (US 6,164,130), in view of Coffey et al. (US 6,492,929 B1).

Re claims 78-80, 112-114, Pifer et al. as modified by Pabst et al. discloses all of the claimed limitations as set forth above except expressly disclosing data compression and data decimation component.

Coffey et al. (US 6,492,929 B1) discloses a method of data compression suitable for sampling lightning (column 2 lines 63-65) discharge data characterized by short-term amplitude excursions using analogue to digital converter for digital conversion with non-uniform sampling. Non-uniform sampling is broadly interpreted as including data decimation.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. as modified by Pabst et al. by adding data compression and data decimation component disclosed by Coffey et al. for sampling lightning discharge data so as to minimize the time required for processing a series of lightning discharge data.

7. Claims 84-85, 100-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. and Premerlani (US 4,674,062 A) in view of Ostrander (US 4,873,483 A).

Re claims 84-85, Kuzma et al. as modified by Premerlani discloses determining lightning type. Cloud-to-ground and intra-cloud lightning discharges are broadly interpreted as lightning types.

Kuzmo et al. as modified by Premerlani did not expressly disclose zero crossing detection.

Ostrander discloses multi-sensor lightning detection system comprising zero crossing detection circuit (Fig. 6) and taking derivative of electromagnetic signal for accurately determining the time and location of lightning discharge (column 8 lines 56-68).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Kuzma ét al. and Premerlani by adding zero crossing detection disclosed by Ostrander for accurately determining the time and location of lightning discharge.

8. Claim 87-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. and Premerlani (US 4,674,062 A) in view of Coffey et al. (US 6,492,929 B1).

Re claims 87-89, Kuzma et al. and Premerlani discloses all of the claimed limitations as set forth above except expressly disclosing data compression and data decimation component.

Coffey et al. discloses method of data compression suitable for sampling lightning (column 2 lines 63-65) discharge data characterized by short-term amplitude excursions using analogue to digital converter for digital conversion with non-uniform sampling. Non-uniform sampling is broadly interpreted as including data decimation.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. as modified by Premerlani by adding data compression and data decimation component disclosed by Coffey et al. for sampling lightning discharge data so as to minimize the time required for processing a series of lightning discharge data.

9. Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. in and Premerlani (US 4,674,062 A) view of Pifer et al. (US 4,914,444).

Re claim 91, Kuzma et al. as modified by Premerlani discloses all of the claimed limitations as set forth above except expressly disclosing discharge correlation component for correlating pulses from a plurality of sources to determine the time and location of discharge in a central processor.

Pifer et al. discloses lightning detection system comprising plurality of data sources (10-13), a central analyzer 16 including a discharge correlation component for correlating discharge data from the sources for determining time and location of discharge in a central processor (column 3 lines 52-56)(Fig. 1).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. and Premerlani by adding discharge correlation component disclosed by Pifer et al. for correlating pulses from a plurality of sources to determine the time and location of discharge.

10. Claims 71-73, 81-83, 86, 90, 92-96, 100-101, 105-107, 116-120, 125-133 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuzma et al. in view of Premerlani (US 4,674,062 A).

Re claims 71-73, 81-83, 86, 90, 92-99, 105-107, 116-120, 125-133 Kuzma et al. discloses all of the claimed limitations as set forth above without expressly disclosing non-linear amplifier responsive to conditioned detection signal.

Premerlani discloses prior art conventional method wherein a non-linear logarithmic amplifier responsive to conditioned detection signal (digital measurements) is used for obtaining digital measurement of an analog signal over a wide dynamic range (column 1 lines 37-53) for systems that experience large changes during relatively short intervals (column 1 lines 54-59).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. by adding non-linear amplifier disclosed in the prior by Premerlani for obtaining digital measurement of an analog signal over a wide dynamic range in systems that experience large changes during relatively short intervals.

Re claim 92, Kuzma et al. discloses source comprising antenna (10)(Fig. 1B).

Re claim 93-94, 100-101, Kuzma et al. did not expressly disclose a circuit for producing a signal representative of the derivative of electromagnetic field. However, it is well known in

the art of processing waveforms to take the magnitude as well as determining derivative (slope) of the analog signal and determining maximum and minimum points on the waveform to characterize the analog waveform.

Premerlani discloses a circuit for producing a derivative (df/dt) of an analog signal (Fig. 3).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kuzma et al. by adding a circuit for producing a derivative disclosed by Premerlani for reducing signal noise and accurately determining an analog waveform.

Re claim 97-99, 131 Kuzma et al. discloses signal conditioning element including filter responsive to electrical detection signal for removing noise (column 6 lines 28-42).

Re claim 133, Kuzma et al. discloses determining lightning type. Cloud-to-ground and intra-cloud lightning discharges are broadly interpreted as lightning types.

Pertinent Art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Henderson et al. (US 5,036,334) discloses a method and system for detecting lightning strokes comprising source of analog signal at remotes sites in a Lightning Detection Network,

A/D converter for converting analog signals to digital and communicating digital signal to central station.

Shoemaker (US 4,455,613) discloses a method of reconstituting an analog signal 13 from a limited number of samples (data decimation) comprising A/D converter 11 for converting the analog signal to a digital representation of the analog signal, taking derivative (slope)(Fig. 4) of the signal, determining maximum and minimum values (Appendix II: column 13,14) of the signal and processor 17 for calculating intermediate points of the waveform for reconstruction and display of the analog signal.

Climent et al. (US 4,876,551) discloses a method and apparatus for the detection of electromagnetic field including lightning (column 1 lines 60-68)(column 13 lines 41-44) comprising antennas 15,17 having means for differentiating (derivative) the signal, determining maximum and minimum values of the signal (column 13 lines 53-68) and having more than three detection systems (column 14 lines 65-67)(Fig. 9).

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.

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7/25/03

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